

WHAT IS CLAIMED IS:

1. A variable capacitor element comprising:
 - a buried electrode layer formed in a surface region of a semiconductor substrate with a semiconductor layer of a conductivity type different from the semiconductor substrate;
 - a wiring layer that is formed above the buried electrode layer and is connected to a lead portion of the buried electrode layer;
 - a pair of capacitive insulating films that are formed as regions having mutually opposing adjacent sides in a plane shape on a portion of the buried electrode layer excluding the lead portion;
 - an insulator layer formed on the border region of each outside of the pair of capacitive insulating films in a direction perpendicular to the adjacent sides;
 - a pair of conductor layers formed both on the respective capacitive insulating films and on the respective insulator layers; and
 - wiring layers that are connected respectively to lead portions of the pair of conductor layers above the insulator layer,
 - wherein a capacitance value between the buried electrode layer and each of the pair of conductor layers can be changed by changing a voltage between the buried electrode layer and each of the pair of conductor layers.
2. The variable capacitor element according to claim 1, wherein each of the pair of capacitive insulating films has a quadrangular plane shape.
3. An integrated circuit having a variable capacitor element, comprising:
 - a resonance circuit composed with a variable capacitor element having the structure according to claim 1, so as to operate as an oscillation circuit,
 - wherein a capacitance value between the buried electrode layer and the pair of conductor layers can be changed by changing a voltage applied to the buried electrode layer of the variable capacitor element.
4. An integrated circuit having a variable capacitor element, comprising:
 - a resonance circuit including at least two variable capacitor elements having the structure according to claim 1 that are connected in parallel, so as to operate as an oscillation circuit; and
 - means for applying, to the buried electrode layer of each of the variable capacitor elements, different voltages obtained with a level converting circuit,

wherein a capacitance value between the buried electrode layer and the pair of conductor layers can be changed.

5. The integrated circuit having a variable capacitor element according to
5 claim 3 or 4, further comprising:
at least one variable capacitor element for frequency range switching
having the structure according to claim 1 that is connected in parallel with the
resonance circuit; and
means for switching a voltage applied to the buried electrode layer of the
10 variable capacitor element for frequency range switching over a plurality of steps,
wherein a capacitance value between the buried electrode layer and the
pair of conductor layers can be changed over a plurality of steps.
6. The integrated circuit having a variable capacitor element according to
15 claim 5,
wherein the means for switching a voltage applied to the buried electrode
layer of the variable capacitor element for frequency range switching is configured
so as to switch the voltage in two steps.